CLAIMS

What is claimed is:

1. An electronic switch assembly comprising:

an electronic switch;

a controller connected to the electronic switch to control the electronic switch; and

a power supply connectable to a power source and connected to the controller, the power supply being configured to receive power from the power source and controllably power the controller, the power supply including a circuit clamp that obstructs power from powering the controller when the voltage of the received power is greater than a threshold.

2. An electronic switch assembly as set forth in claim 1 wherein the power supply includes a Zener diode, and wherein the threshold is approximately the reverse breakdown voltage of the Zener diode.

3. An electronic switch assembly as set forth in claim 1 wherein the power supply includes a switch and a Zener diode that controls the switch, wherein the Zener diode promotes a current through the Zener diode when the voltage of the power source is approximately equal to the reverse breakdown voltage of the Zener diode, and wherein the current controls the switch to obstruct the power from powering the controller.

4. An electronic switch assembly as set forth in claim 1 wherein the switch shorts the power supply in response to the current from the Zener diode.

5. An electronic switch assembly as set forth in claim 1 wherein the controller includes a sensor that senses a parameter, and wherein the controller selectively controls the electronic switch based on the parameter.

6. An electric machine connectable to a power supply, the electric machine comprising:

a rotor;

a winding; and

an electronic switch assembly electrically connected in a series relationship with the winding, the electronic switch assembly comprising

an electronic switch;

a controller connected to the electronic switch to control the electronic switch;

a power supply connectable to the power source and connected to the controller, the power supply being configured to receive power from the power source and controllably power the controller, the power supply including a circuit clamp that obstructs power from powering the controller when the voltage of the received power is greater than a threshold, thereby preventing current through the winding.

7. An electric motor as set forth in claim 6 wherein the power supply includes a Zener diode, and wherein the threshold is approximately the reverse breakdown voltage of the Zener diode.

8. An electric machine as set forth in claim 6 wherein the power supply includes a switch and a Zener diode that controls the switch, wherein the Zener diode promotes a current through the Zener diode when the voltage of the power source is approximately equal to the reverse breakdown voltage of the Zener diode, and wherein the current controls the switch to obstruct the power from powering the controller.

9. An electric machine as set forth in claim 6 wherein the switch shorts the power supply in response to the current from the Zener diode.

10. An electric machine as set forth in claim 6 wherein the controller includes a sensor that senses a parameter, and wherein the controller selectively controls the electronic switch based on the parameter.

11. An electric machine as set forth in claim 6 wherein the controller includes a current sensor that senses a current through the switch and wherein the controller selectively controls the electronic switch based on a sensed current.

12. An electric machine as set forth in claim 11 wherein the controller opens the electronic switch when the sensed current is greater than a threshold.

13. An electric machine as set forth in claim 6 wherein the controller includes

a generator that provides a first signal,

a circuit control including a sensor that senses a parameter, the circuit control providing a second signal based on the sensed parameter,

decision logic connected to the generator, the circuit control, and the switch, the decision logic receiving the first and second signals and generating a control signal that selectively controls the electronic switch based on the first and second signals.

14. An electric machine as set forth in claim 13 wherein the switch includes a triac, and wherein the first signal includes a plurality of pulses.

15. An electric machine as set forth in claim 14 wherein the controller further includes a voltage sense circuit including a sensor that senses the voltage across the triac.

16. An electric machine as set forth in claim 15 wherein the pulses have a relation to the inception of voltage after the zero crossings of the sensed voltage.

17. An electric machine as set forth in claim 13 wherein the circuit control includes a timer, and wherein the circuit control provides the second signal based on the sensed parameter and the timer.

18. An electric machine as set forth in claim 17 wherein the control signal opens the switch when the timer times a period.

19. An electric machine as set forth in claim 18 wherein the control signal opens the switch when the sensed parameter is greater than a threshold.

20. An electric machine as set forth in claim 19 wherein the circuit control includes a delay preventing the opening of the switch during a second time period.

21. An electric machine as set forth in claim 19 wherein the sensor is a current sensor and the parameter a current through the switch.

22. An electric machine as set forth in claim 13 wherein the control signal opens the switch when the sensed parameter is greater than a threshold.

23. An electric machine as set forth in claim 22 wherein the sensor is a current sensor and the parameter is a current through the switch.

24. A method of controlling an electric machine with power from a power source, the electric machine comprising a rotor, a winding, and an electronic switch assembly electrically connected to the winding, the electronic switch assembly including an electronic switch, a controller connected to the electronic switch to control the electronic switch, and a power supply connected to the power source and the controller, the method comprising the acts of:

connecting the electronic switch assembly to the power source;

powering the power supply;

determining at the power supply whether the voltage of the power is greater than a value; and

obstructing the power from powering the controller when the voltage is greater than the value.

25. A method as set forth in claim 24 and further comprising preventing current through the winding in response to obstructing power from powering the controller.

26. A method as set forth in claim 25 wherein the electric machine is a motor and wherein the method further comprises preventing the motor from starting in response to preventing current through the winding.

27. A method as set forth in claim 26 wherein obstructing power from powering the controller includes shorting the power supply.

28. A method as set forth in claim 24 wherein obstructing power from powering the controller includes shorting the power supply.

29. A method of controlling an electric machine with power from a power source, the electric machine comprising a rotor, a winding, and a switch assembly electrically connected in a series relationship with the winding, the switch assembly including a switch and a controller connect to the electronic switch to control the electronic switch, the method comprising the acts of:

connecting the motor to the power source;

allowing current through the electronic switch;

monitoring the current; and

preventing current through the electronic switch when the monitored current flares.

30. A method as set forth in claim 29 wherein monitoring the current includes sensing the current, and determining a threshold based on an initial sensed current.

31. A method as set forth in claim 30 wherein preventing current through the electronic switch includes comparing the sensed current with the threshold.

32. A method as set forth in claim 31 wherein preventing current through the electronic switch includes preventing flow of the current through the electronic switch when the sensed current is greater than the threshold.

33. A method as set forth in claim 29 wherein the switch includes an electronic switch.

34. A method as set forth in claim 33 wherein the electronic switch includes a triac.

35. A method as set forth in claim 34 wherein allowing current through the electronic switch includes pulsing the triac.

36. A method as set forth in claim 35 wherein the method further includes monitoring the voltage of the power provided to the switch assembly and pulsing the triac based on the monitored voltage.

37. A method as set forth in claim 35 wherein monitoring the voltage of the power includes monitoring the voltage for zero crossings and pulsing the triac in relation to the inception of voltage after zero crossings.

38. An electric machine connectable to a power supply, the electric machine comprising:

a rotor;

a winding, and

a switch assembly connected in a series relationship with the winding, the switch assembly comprising

a switch, and

a controller connected to the switch to control the switch, the controller comprising a current sensor that senses a current through the switch, a scaler that generates a threshold based on the sensed current, and decision logic that controls the switch based on the sensed current and the threshold.

39. An electric machine as set in claim 38 wherein the scaler generates a threshold having a relation to the sensed current such that the decision logic detects when the sensed current flares.

40. An electric machine as set forth in claim 38 wherein the current sensor includes a resistor.

41. An electric machine as set forth in claim 40 wherein the scaler includes a capacitor that charges to a voltage having a relation to the current through the resistor, the charged voltage having a relation to the threshold, and a switch that provides a signal to the decision logic when the voltage drop across the resistor is greater than the threshold.

42. An electric machine as set forth in claim 38 wherein the switch includes an electronic switch.

43. An electric machine as set forth in claim 42 wherein the switch assembly further includes a power supply connectable to the power source and connected to the controller, the power supply being configured to receive power from the power source and controllably power the controller, the power supply including a circuit clamp that obstructs power from powering the controller when the voltage of the received power is greater than a threshold, thereby preventing current through the winding.

44. An electric machine as set forth in claim 43 wherein the decision logic opens the electronic switch when the sensed current is greater than a threshold.

45. An electric machine as set forth in claim 38 wherein the controller further includes a generator that provides a signal, and wherein the decision logic controls the switch further based on the generated signal.

46. An electric machine as set forth in claim 45 wherein the switch includes a triac, and wherein the first signal includes a plurality of pulses.

47. An electric machine connectable to a power supply, the electric machine comprising:

a rotor;

a winding; and

an electronic switch assembly electrically connected in a series relationship with the winding, the electronic switch assembly comprising

an electronic switch,

a generator that provides a first signal,

a circuit control including a sensor that senses a parameter, the circuit control providing a second signal based on the sensed parameter,

decision logic connected to the generator, the circuit control and the electronic switch, the decision logic receiving the first and second signals and generating a control signal that selectively controls the electronic switch based on the first and second signals.

48. An electric machine as set forth in claim 47 wherein the electronic switch includes a triac, and wherein the first signal includes a plurality of pulses.

49. An electric machine as set forth in claim 48 wherein the controller further includes a voltage sense circuit including a sensor that senses the voltage across the triac.

50. An electric machine as set forth in claim 49 wherein the pulses have a relation to the inception of voltage after the zero crossings of the sensed voltage.

51. An electric machine as set forth in claim 47 wherein the circuit control includes a timer, and wherein the circuit control provides the second signal based on the sensed parameter and the timer.

52. An electric machine as set forth in claim 51 wherein the control signal opens the switch when the timer times a period.

53. An electric machine as set forth in claim 52 wherein the control signal opens the switch when the sensed parameter is greater than a threshold.

54. An electric machine as set forth in claim 53 wherein the circuit control includes a delay preventing the opening of the switch during a second time period.

55. An electric machine as set forth in claim 53 wherein the sensor is a current sensor and the parameter is a current through the switch.

56. An electric machine as set forth in claim 47 wherein the control signal opens the switch when the sensed parameter is greater than a threshold.

57. An electric machine as set forth in claim 56 wherein the sensor is a current sensor and the parameter is a current through the switch.